Potlatch River Watershed

TMDL Five-Year Review

FINAL

State of Idaho
Department of Environmental Quality
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Table of Contents

List of Tables

List of Figures

Abbreviations, Acronyms, and Symbols

AU	assessment unit
BMP	best management practice
BURP	Beneficial Use Reconnaissance Program
cfs	cubic feet per second
cfu/100 mL	colony forming units per 100 milliliters
COLD	cold water aquatic life
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
DWS	domestic water supply
E. coli	*Escherichia coli*
EPA	United States Environmental Protection Agency
FS	fully supporting
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
ITD	Idaho Transportation Department
lb	pound
LWD	large woody debris
mg/L	milligrams per liter
MOS	margin of safety
NA	not assessed
NFS	not fully supporting
NPDES	National Pollutant Discharge Elimination System
PALS	post-assisted log structure
PCR	primary contact recreation
SCR	secondary contact recreation
SFI	Stream Fish Index
SHI	Stream Habitat Index
SMI	Stream Macroinvertebrate Index
SS	salmonid spawning
SWCD	Soil and Water Conservation District
TIN	total inorganic nitrogen
TMDL	total maximum daily load
TP	total phosphorus
TSS	total suspended solids
USFS	United States Forest Service
WAG	watershed advisory group
WWTP	wastewater treatment plant

Executive Summary

This review of the *Potlatch River Subbasin Assessment and TMDLs* (Potlatch River TMDL) (DEQ 2008) addresses water bodies in the Potlatch River watershed that are in Category 4(a) of the most recent Integrated Report (DEQ 2017). This 5-year review complies with Idaho Code §39-3611(7) and describes current water quality status, pollutant sources addressed by established total maximum daily loads (TMDLs), and recent pollution control efforts in the Potlatch River watershed, located in northern Idaho. The assessment units (AUs) in the TMDL subject to review are shown in Table A. The Potlatch River TMDL was approved by the United States Environmental Protection Agency in February 2009. An agricultural implementation plan was developed in 2010 for the Potlatch River TMDL (ISCC 2010).

Table A. Existing TMDLs.

Assessment Unit Name	Assessment Unit ID	Pollutants
Potlatch River - 6th Order	ID17060306CL044_06	Temperature, sediment
Potlatch River - 5th Order	ID17060306CL045_05	Temperature
Cedar Creek - 4th Order	ID17060306CL046_04	Temperature, sediment
Boulder Creek - 3rd Order	ID17060306CL047_03	Temperature, *E. coli* bacteria
Potlatch River - 4th Order	ID17060306CL048_04	Temperature
Potlatch River - 5th Order	ID17060306CL048_05	Temperature
Potlatch River - Headwaters	ID17060306CL049_02	Temperature, *E. coli* bacteria
Potlatch River - 3rd Order	ID17060306CL049_03	Temperature, *E. coli* bacteria
Potlatch River - 4th Order	ID17060306CL049_04	Temperature, *E. coli* bacteria
East Fork Potlatch River - 4th Order	ID17060306CL051_04	Temperature
Ruby Creek - 3rd Order	ID17060306CL052_03	Temperature, *E. coli* bacteria
Moose Creek - Headwaters	ID17060306CL053_02	Temperature, *E. coli* bacteria
Moose Creek - 3rd Order	ID17060306CL053_03	Temperature, *E. coli* bacteria
Corral Creek - Headwaters	ID17060306CL054_02	Temperature
Corral Creek - 3rd Order	ID17060306CL054_03	Temperature
Pine Creek - Headwaters	ID17060306CL055_02	Temperature, nutrients (phosphorus), sediment
Pine Creek - 3rd Order	ID17060306CL055_03	Temperature, nutrients (phosphorus), sediment
Big Bear Creek - 4th Order	ID17060306CL056_04	Temperature, *E. coli* bacteria
Big Bear Creek - 5th Order	ID17060306CL056_05	Temperature, *E. coli* bacteria
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	Sediment, nutrients (nitrogen), *E. coli* bacteria
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	Sediment, nutrients (nitrogen), *E. coli* bacteria
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	Temperature, sediment, *E. coli* bacteria
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	Temperature, sediment, *E. coli* bacteria

Watershed at a Glance

The Potlatch River watershed is part of the Lower Clearwater River subbasin (hydrologic unit code 17060306). The watershed encompasses approximately 380,400 acres, draining into the Clearwater River between Myrtle and Spalding. The upper reaches of the Potlatch River are divided into two main tributaries, the East Fork and West Fork Potlatch Rivers. The East Fork originates in the northwestern corner of Clearwater County and flows southwest to its confluence with the main stem. The West Fork originates in the northeastern corner of Latah County and flows southeast to its confluence with the Potlatch River. The Potlatch River drains the eastern two-thirds of Latah County, running from northeast to southwest.

Land uses in the upper watershed include forestry, livestock, and agriculture. The river flows onto the Nez Perce Reservation approximately 7 miles upstream from its confluence with the Clearwater River. Stream and river flows in the Potlatch River watershed reflect weather patterns. Most of the precipitation occurs during winter and early spring with very little precipitation occurring during the summer months. This pattern tends to cause high peak flows in early spring and extremely low flows in late summer.

The upper Potlatch River drains rolling hills and meadows of the eastern edge of the Columbia River basalt plateau and the adjacent Clearwater Mountains. Elevations range from approximately 2,500 feet on the plateau to nearly 5,000 feet on some of the mountains surrounding the watershed.

Key Findings

Table B provides the status and recommendations for the Potlatch River watershed. The findings show that the six AUs being recommended to move from Category 4a to Category 2 in the Integrated Report for bacteria and contact recreation have data that show the 126 cfu/100 Ml geometric mean criterion is being met and that the AUs fully support contact recreation beneficial uses.

Table B. Watershed at a glance.

TMDL	TMDL Status	Pollutants	Assessment Unit Recommendation
Potlatch River Subbasin Assessment and TMDLs (DEQ 2008)	Approved by EPA in February 2009	*E. coli* bacteria, nutrients, sediment, and temperature	Move AUs from Category 4a to 2 in Integrated Report for bacteria and contact recreation: ID17060306CL049_03 ID17060306CL056_04 ID17060306CL056_05 ID17060306CL061_02 ID17060306CL062_02 ID17060306CL062_03

Public Participation

The general public was able to comment on this document through the watershed advisory group process.

1 Introduction

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. CWA §303(d) establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

Idaho Code §39-3611(7) requires a 5-year cyclic review process for Idaho TMDLs.

> The director shall review and reevaluate each TMDL, supporting subbasin assessment, implementation plan(s) and all available data periodically at intervals of no greater than five (5) years. Such reviews shall include the assessments required by section 39-3607, Idaho Code, and an evaluation of the water quality criteria, instream targets, pollutant allocations, assumptions and analyses upon which the TMDL and subbasin assessment were based. If the members of the watershed advisory group, with the concurrence of the basin advisory group, advise the director that the water quality standards, the subbasin assessment, or the implementation plan(s) are not attainable or are inappropriate based upon supporting data, the director shall initiate the process or processes to determine whether to make recommended modifications. The director shall report to the legislature annually the results of such reviews.

To meet the intent and purpose of Idaho Code §39-3611(7), this report documents the review of the *Potlatch River Subbasin Assessment and TMDLs* (Potlatch River TMDL) (DEQ 2008) and addresses the water bodies in the Potlatch River watershed that are in Category 4(a) of Idaho's most recent Integrated Report (DEQ 2017). This report reviews the approved TMDL and implementation plan, considers the most current and applicable information in conformance with Idaho Code §39-3607, evaluates the appropriateness of the TMDL to current watershed conditions, evaluates the implementation plan, and provides for watershed advisory group (WAG) consultation. TMDL modifications are decided by the Idaho Department of Environmental Quality (DEQ) director. Approval of TMDL modifications is decided by the US Environmental Protection Agency (EPA) with consultation from DEQ.

Assessment Units

Assessment units (AUs) are groups of similar streams that have similar land use practices, ownership, or land management. Stream order is the main basis for determining AUs—even if ownership and land use change significantly, the AU usually remains the same for the same stream order.

Using AUs to describe water bodies offers many benefits, primarily that all waters of the state are defined consistently. AUs are a subset of water body identification numbers, which allows them to relate directly to the water quality standards.

2 TMDL Review and Status

2.1 Watershed Characteristics

The Potlatch River watershed (hydrologic unit code 17060306) (Figure 1) is found in the Clearwater River subbasin. The watershed encompasses approximately 380,400 acres, draining into the Clearwater River between Myrtle and Spalding. The upper reaches of the Potlatch River are divided into two main tributaries, the East Fork and West Fork Potlatch Rivers. The East Fork originates in the northwestern corner of Clearwater County and flows southwest to its confluence with the main stem. The West Fork originates in the northeastern corner of Latah County and flows south to its confluence with the Potlatch River. The Potlatch River drains the eastern two-thirds of Latah County, running from northeast to southwest. The river flows onto the Nez Perce Reservation approximately 7 miles upstream from its confluence with the Clearwater River (DEQ 2008). The locations of water bodies in the watershed listed in Idaho's 2014 Integrated Report (DEQ 2017) are shown in Figure 1.

There are currently eight National Pollutant Discharge Elimination System (NPDES) point sources within the Potlatch River watershed (Table 1); of those, three are multi-sector general permit types. Further discussion of wasteload allocations are presented in later sections within this document. Additional information related to the NPDES-permitted point sources in the Potlatch River watershed can be found in the Potlatch River TMDL (DEQ 2008).

Table 1. NPDES-permitted point sources in the Potlatch River watershed.

Permit ID #	Facility Name	NPDES Type
ID0023604	City of Troy WWTP	POTW
ID0024554	City of Kendrick WWTP	POTW
ID0020788	City of Deary WWTP	POTW
ID0022861	City of Bovill WWTP	POTW
ID0023761	City of Juliaetta WWTP	POTW
IDR00A231	The McGregor Company	MSGP
IDR053100	I-Minerals Bovill Kaolin Project	MSGP
IDR053101	Bovill Mine	MSGP

Notes: MSGP = multi-sector general permit; POTW = publicly owned treatment works; WWTP = wastewater treatment plant

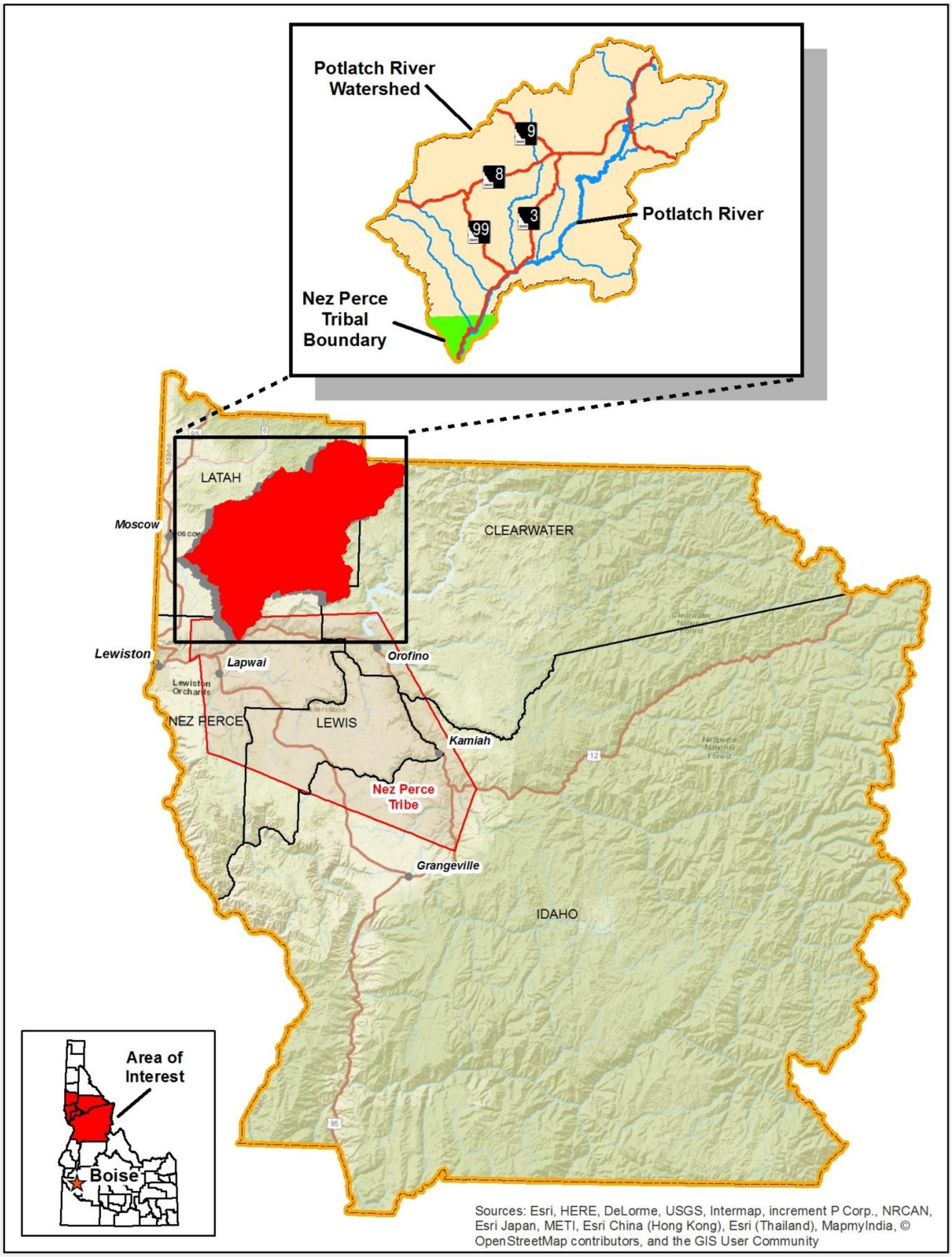

Figure 1. Watershed location.

2.2 TMDL Review and Status by Pollutant

2.2.1 *E. coli* Bacteria

2.2.1.1 Instream Water Quality Targets

Instream water quality targets for the listed streams in the Potlatch River TMDL for *Escherichia coli (E. coli)* bacteria were set based on the Idaho water quality standards. Waters designated for primary or secondary contact recreation must not to contain *E. coli* in concentrations exceeding a geometric mean of 126 colony forming units/100 milliliters (cfu/100 mL) based on a minimum of five samples taken every 3–7 days over a 30-day period (IDAPA 58.01.02.251.01.a). The load capacity used to establish the instream target and allocations for AUs listed for bacterial impairment (DEQ 2008) is based on this criterion (Table 2).

Table 2. Assessment units with *E. coli* TMDLs.

Assessment Unit Name	Assessment Unit ID	Beneficial Use	Type of Use	*E. coli* Numeric Criteria (cfu/100 mL)	Critical Period
Boulder Creek - 3rd Order	ID17060306CL047_03	SCR	Presumed	126	Year-round
Potlatch River - Headwaters	ID17060306CL049_02	PCR	Designated	126	Year-round
Potlatch River - 3rd Order	ID17060306CL049_03	PCR	Designated	126	Year-round
Potlatch River - 4th Order	ID17060306CL049_04	PCR	Designated	126	Year-round
Ruby Creek - 3rd Order	ID17060306CL052_03	SCR	Presumed	126	Year-round
Moose Creek - Headwaters	ID17060306CL053_02	SCR	Presumed	126	Year-round
Moose Creek - 3rd Order	ID17060306CL053_03	SCR	Presumed	126	Year-round
Big Bear Creek - 4th Order	ID17060306CL056_04	SCR	Presumed	126	Year-round
Big Bear Creek - 5th Order	ID17060306CL056_05	SCR	Presumed	126	Year-round
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	SCR	Presumed	126	Year-round
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	SCR	Presumed	126	Year-round
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	SCR	Designated	126	Year-round
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	SCR	Designated	126	Year-round

Notes: cfu/100 mL = colony forming unit/100 milligrams; PCR = primary contact recreation; SCR = secondary contact recreation

2.2.1.2 Monitoring Points and Sampling Process

Water quality monitoring for *E. coli* occurred at 13 sites on the Potlatch River and tributaries listed in Table 2 (Figure 2). The monitoring schedule was designed to capture geometric means during spring, summer, and fall (Appendix A). The established monitoring sites used in the TMDL are also the compliance points. Because *E. coli* can travel throughout the entire stream, beneficial uses must be met throughout each §303(d)-listed stream; therefore, each monitoring site is a compliance point for the bacteria TMDLs.

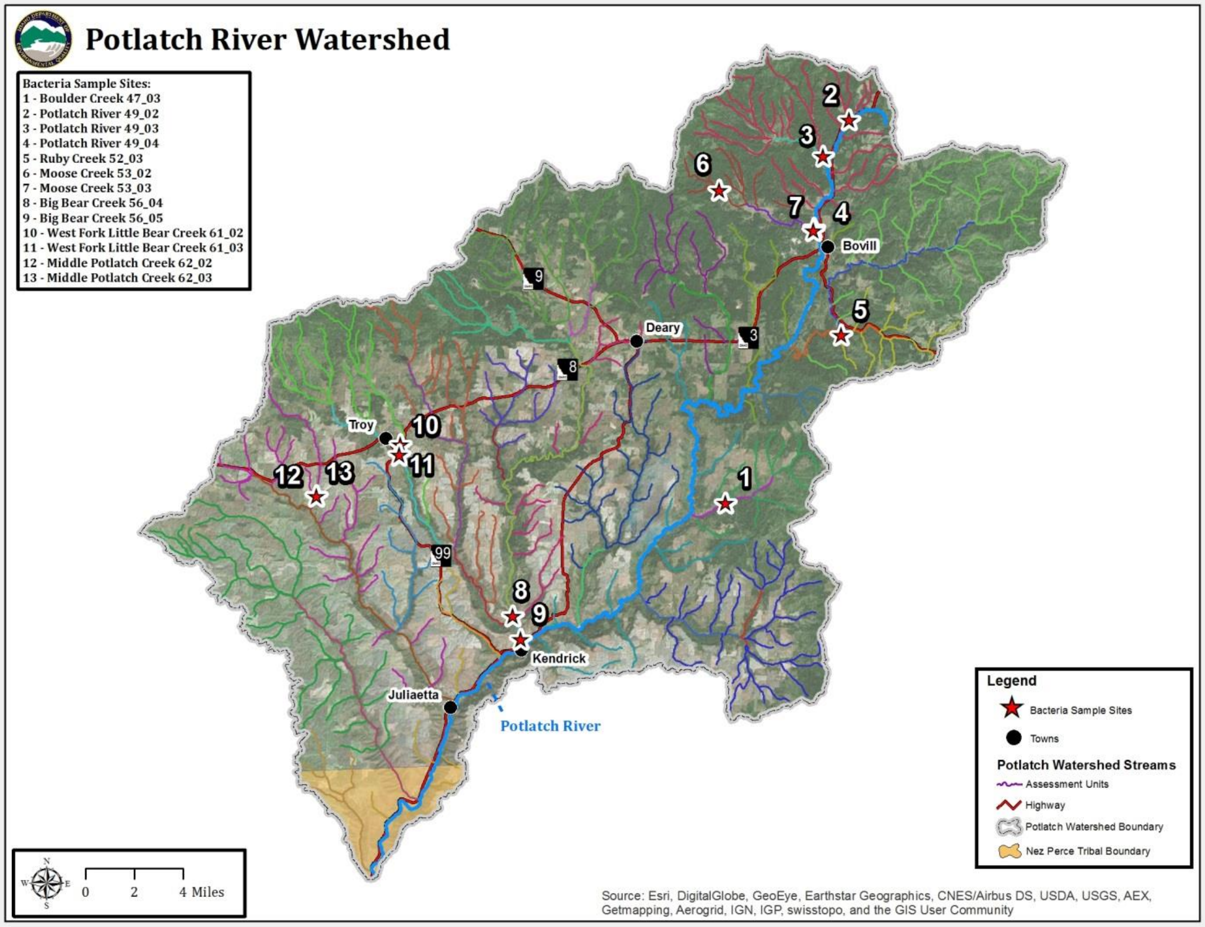

Figure 2. *E. coli* monitoring points.

2.2.1.3 Load Capacity

The *E. coli* load capacity for the listed AUs in the Potlatch River TMDL is a geometric mean of 126 cfu/100 mL. The load capacity is expressed as a concentration (cfu/100 mL) because the calculation of mass load is difficult due to the variability of temperature, moisture conditions, and flow, which can all influence the die-off rate of *E. coli* in the environment (EPA 2001).

2.2.1.4 Load Allocation

Bacteria are living organisms, and varying water quality and atmospheric conditions, which fluctuate continuously, dictate the mass of bacteria in the water. This fluctuation can complicate the load allocation process. For this TMDL review, the daily load allocation for nonpoint and point sources is 126 cfu/100 mL. Table 3 lists the existing *E. coli* monthly geometric mean bacteria concentrations calculated from measurements at the monitoring points established in the Potlatch River TMDL. The table also shows the load reduction needed to comply with the 126 cfu/100 mL criterion. A full dataset is provided in Appendix A.

The *E. coli* TMDL for the Potlatch River TMDL allocates a daily concentration to all nonpoint sources of *E. coli* upstream from the sample site. The sources extending upstream from these locations must be managed to reduce the instream *E. coli* concentrations according to the load reductions in Table 3. To ensure the criterion is not exceeded, this allocation will apply throughout the year.

Table 3. Seasonal *E. coli* loads (cfu/100 mL).

Stream Name	Assessment Unit Number	Spring		Summer		Fall	
		Existing Load	Load Red. (%)	Existing Load	Load Red. (%)	Existing Load	Load Red. (%)
Boulder Creek - 3rd Order	ID17060306CL047_03	33	0	145	13	46	0
Potlatch River - Headwaters	ID17060306CL049_02	9	0	129	2	597	79
Potlatch River - 3rd Order	ID17060306CL049_03	5	0	107	0	23	0
Potlatch River - 4th Order	ID17060306CL049_04	37	0	138	9	112	0
Ruby Creek - 3rd Order	ID17060306CL052_03	7	0	99	0	108	0
Moose Creek - Headwaters	ID17060306CL053_02	6	0	137	8	63	0
Moose Creek - 3rd Order	ID17060306CL053_03	8	0	324	61	96	0
Big Bear Creek - 4th Order	ID17060306CL056_04	12	0	13	0	40	0
Big Bear Creek - 5th Order	ID17060306CL056_05	4	0	20	0	54	0
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	7	0	NA	NA	14	0
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	30	0	91	0	206	39
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	19	0	8	0	8	0
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	16	0	82	0	25	0

2.2.1.5 Wasteload Allocation

Wasteload allocations were provided for five permitted wastewater treatment plant (WWTP) NPDES facilities in the Potlatch River TMDL (DEQ 2008) (Table 4). Wasteload allocations were based on the numeric standard of an allowable monthly geometric mean concentration of 126 cfu/100 mL with a maximum daily limit of 406 cfu/100 mL.

Table 4. *E. coli* wasteload allocations for NPDES-permitted facilities.

WWTP Facility	Instantaneous Maximum Load Allocation (cfu/100 mL)	30-Day Geometric Mean Load Allocation (cfu/100 mL)
ID0023604 City of Troy	406	126
ID0024554 City of Kendrick	406	126
ID0020788 City of Deary	406	126
ID0022861 City of Bovill	406	126
ID0023761 City of Juliaetta	406	126

2.2.1.6 Margin of Safety

In the case of *E. coli*, the pollutant load capacity has been calculated for the most critical time periods identified and is applied year-round. Existing loads are based on recent data and the geometric mean. The margin of safety (MOS) for point and nonpoint sources is provided using recent data and the geometric mean. The load capacity of the effluent is the wasteload allocation for the point sources. The application of the conservative geometric mean criteria methods for TMDL calculations provides an implicit MOS.

2.2.2 Nutrients

2.2.2.1 Instream Water Quality Targets

In Idaho, a narrative water quality standard is used to protect cold water aquatic life beneficial uses from excessive nutrients. Idaho's narrative standard for nutrients states "surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses" (IDAPA 58.01.02.200.06). Aquatic life beneficial uses can be impaired when excessive algae decompose, depleting dissolved oxygen in the water column. Monitoring data in the TMDL indicated that phosphorus was the limiting nutrient for aquatic plant growth in the Pine Creek AUs.

A total inorganic nitrogen (TIN) wasteload allocation was developed for the city of Troy and applied to the West Fork Little Bear Creek AUs in Table 5.

Table 5. Assessment units with nutrient TMDLs.

Assessment Unit Name	Assessment Unit Number	Beneficial Use	Type of Use
Pine Creek - Headwaters	ID17060306CL055_02	COLD	Presumed
Pine Creek - 3rd Order	ID17060306CL055_03	COLD	Presumed
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	COLD	Presumed
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	COLD	Presumed

Note: COLD = cold water aquatic life

Pine Creek

Total phosphorus (TP) was used as a surrogate target for nutrients in the two Pine Creek AUs (Table 6) in the Potlatch River TMDL. A TP target of 0.100 milligram per liter (mg/L) was used for the Pine Creek AUs based on EPA guidance recommendations that TP levels do not exceed 0.100 mg/L (EPA 1986). A 10% MOS was deducted from the load capacity to determine the load allocation for the AUs. The critical time period coincides with the low flow summer period of June through September.

West Fork Little Bear Creek

A nutrient TMDL that addressed TIN was developed for West Fork Little Bear Creek based on nutrient data that showed that it was nitrogen-limited based on the 6.8:1 Total Inorganic Nitrogen to Orthophosphate ratio. The interim instream water quality target of 3.0 mg/L TIN was developed as a surrogate target for nutrients in the Potlatch River TMDL. The critical time period occurs when flows approximate 1.5 cubic feet per second (cfs) or less. An analysis of the ammonia data that was collected during the 2001–2002 and 2006–2007 monitoring seasons and included in the TMDL showed no violations of the acute or chronic criteria for ammonia in

Idaho’s water quality standards. Data suggest that nitrification was occurring instream and was affecting instream oxygen concentrations (section 2.2.2.5).

2.2.2.2 Monitoring Points

Water quality monitoring for nutrients occurred at four sites in the Potlatch River watershed listed in Table 5 (Figure 3). The monitoring schedule was designed to collect nutrient data as long as flow was present in the streams (Appendix B, Appendix C). The established monitoring sites used in the TMDLs are also the compliance points, and beneficial uses must be met throughout each §303(d)-listed stream; therefore, each monitoring site is a compliance point for the nutrient TMDLs.

As part of the watershed monitoring plan used to generate data for the Potlatch River TMDL, DEQ established two monitoring sites on West Fork Little Bear Creek in 2001, one above the WWTP and one just below the plant’s effluent outfall pipe. The proximity of the lower monitoring site to the outfall pipe did not allow for complete mixing of the effluent with the receiving water, and the data collected is more representative of the effluent and not considered to be representative of the receiving water; thus, it was not appropriate for listing the stream or for calculating a separate load and wasteload allocation for the West Fork Little Bear Creek. In 2006, the Idaho Association of Soil Conservation Districts and the Idaho State Department of Agriculture located a second monitoring site approximately 200 yards further downstream to collect instream water samples that better represent instream receiving water quality conditions.

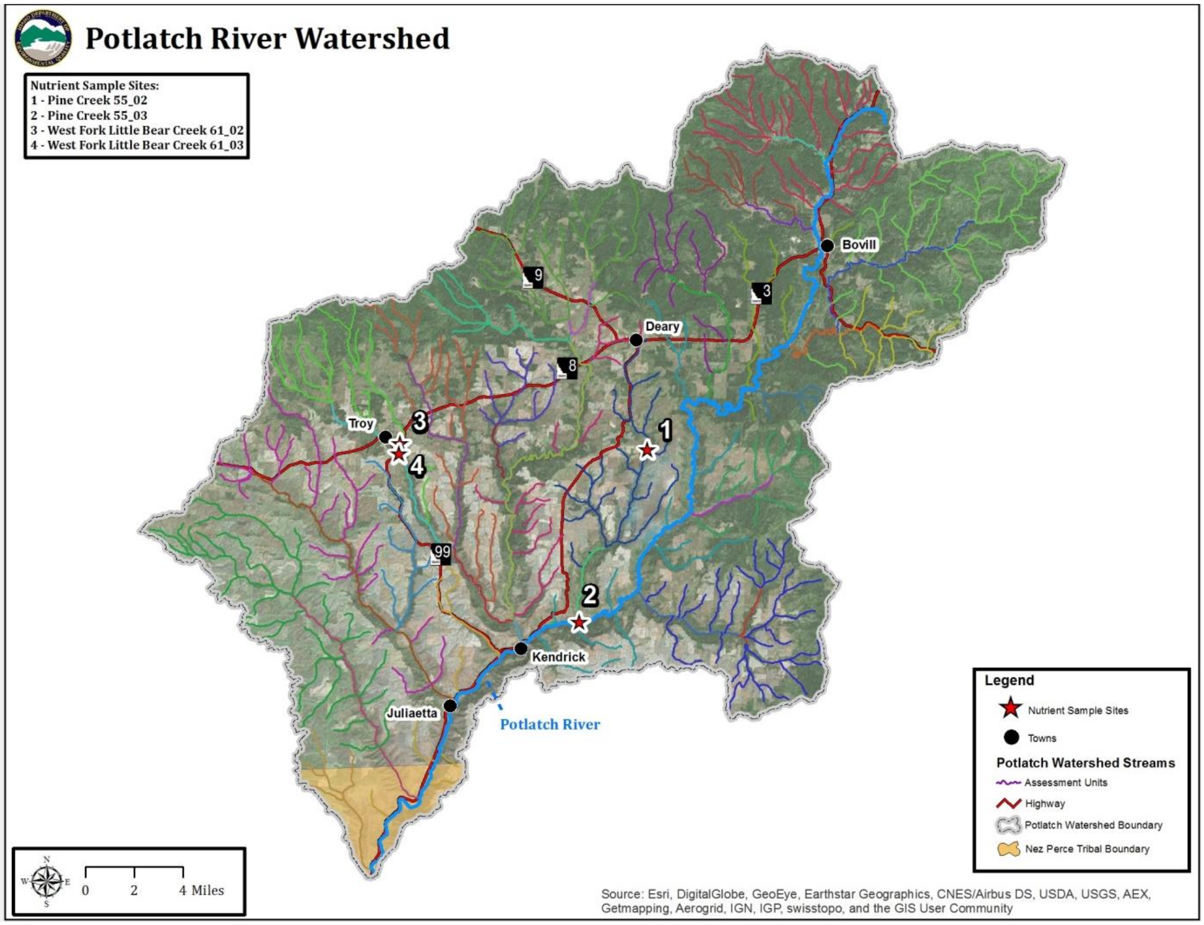

Figure 3. Nutrient monitoring sites.

2.2.2.3 Load Capacity

Pine Creek

The TP load capacity for Pine Creek was developed for June through September using flow and TP data. The daily load capacity was estimated using the target concentration multiplied by the average daily flow. Background loads are included as part of the loading capacity. A 10% MOS was subtracted from the load capacity to produce an available load capacity (Table 6).

2.2.2.4 Load Allocation

Pine Creek

Pollutant loads for TP are presented in Table 6. Because specific source load data are not available, listed loads are comprehensive estimates between each monitoring station. These gross allocations account for all sources, such as stormwater runoff, agricultural practices, septic systems, and livestock operations. Load capacities include background conditions. A 10% MOS was deducted from the load capacity to determine the load allocation for the AUs. Additional TP data and flow measurements are provided in Appendix B.

Table 6. Assessment unit pollutant loads for TP.

Assessment Unit Name	Assessment Unit	Average Daily Flow (cfs)	Average Daily Concentration (mg/L)	Load Capacity (kg/day)	MOS (kg/day)	Load Allocation (kg/day)	Existing Load (kg/day)
Pine Creek	ID17060306CL055_02	0.463	0.069	0.113	0.011	0.102	0.078
Pine Creek	ID17060306CL055_03	1.16	0.083	0.284	0.028	0.256	0.235

Notes: cfs = cubic foot per second; kg/day = kilogram per day; mg/L = milligram per liter

2.2.2.5 Wasteload Allocation

West Fork Little Bear Creek

The interim TIN flow-based target included in the Potlatch River TMDL was calculated using flow data collected during the 2006–2007 sampling period. Currently, the available water quality data and stream flow data are not adequate to develop separate load and wasteload allocations. Additional data need to be generated and considered in any effluent discharge limitations included in future NPDES permits for the city of Troy's WWTP discharge. During the 2008 TMDL process, the city of Troy made a commitment to obtain additional stream flow, dissolved oxygen, and nutrient data that would be used to identify, develop, and implement an appropriate process strategy to ensure the city's effluent is adequately treated and does not adversely impair the beneficial uses of West Fork Little Bear Creek. Water quality data will be collected on a continuous basis beginning with the next NPDES permit cycle. The data will be evaluated on a cycle concurrent with applicable NPDES permit cycles, allowable NPDES permit compliance schedules, and Idaho's required TMDL review cycles. The foremost objective of the monitoring is to develop a 7Q10 flow based on instream flow measurements for determination of effluent limitations included in any future NPDES permit issued to the city for discharges into West Fork Little Bear Creek.

2.2.2.6 Margin of Safety

An explicit MOS of 10% was deducted from the load capacity to determine the nutrient allocations for both Pine Creek and West Fork Little Bear Creek. The allocations reflect a seasonally conservative estimate since the loading capacity is based on the summer period when stream flow volume decreases significantly. The explicit deduction accounts for uncertainties about the relationship between physical, chemical, and hydrological factors such as higher ambient air and water temperatures, length of day, and decreased stream flows during the summer growing season, which influence aquatic plant growth cycles, biochemical oxygen demand, and instream dissolved oxygen.

2.2.3 Sediment

2.2.3.1 Instream Water Quality Targets

The sediment criteria found in the water quality standards (IDAPA 58.01.02.200.08) is narrative, meaning there is not a numeric value to assess whether a water body is in compliance with standards. Instead, the standard states sediment shall be limited to a quantity that does not impair beneficial uses.

Numeric criteria exist for turbidity—the measure of light dispersion caused by particles suspended in a water column. Light penetration, turbidity, and suspended solids are correlated, though the characteristics of the particles in suspension can change the degree of light dispersion or penetration (DEQ 2003). This criterion relates specifically to mixing zones that are typically associated with point sources. Total suspended solids (TSS) have been found to correlate with turbidity in specific watersheds; however, the relationship between the two water column measures are sensitive to location and time period, so the application of a predictive model may be limited to the year and specific sites for which the model was developed (DEQ 2003).

The effects of sediment on the most sensitive designated beneficial uses in the Potlatch River watershed are dependent on concentration and duration of exposure. Guidance developed by DEQ for applying the narrative sediment criteria to protect aquatic life beneficial uses states that a sediment target should incorporate both concentration and duration of exposure, not only to properly protect aquatic life but also to allow for episodic spikes in TSS that can occur naturally with spring runoff or heavy precipitation events (DEQ 2003).

Sediment targets for the Potlatch River TMDL were developed using the *Guide to Selection of Sediment Targets for Use in Idaho TMDLs* (DEQ 2003). Based on the information contained in the guidance, a 50 mg/L TSS monthly target, not to exceed 80 mg/L daily, was used to develop the sediment TMDL. The average monthly target and maximum daily limit are within the range identified by the European Inland Fisheries Advisory Commission and the Committee on Water Quality Criteria from the Environmental Studies Board of the National Academy of Science and National Academy of Engineers as supporting a moderate fishery (DEQ 2003). Additionally, these targets are consistent with targets applied in other sediment TMDLs addressing TSS in the Lower Clearwater River subbasin.

2.2.3.2 Monitoring Points

Water quality monitoring for sediment occurred at eight sites in the Potlatch watershed (Table 7; Figure 4). The monitoring schedule was designed to collect nutrient data as long as flow was present in the streams. The established monitoring sites used in the TMDLs are also the compliance points, and beneficial uses must be met throughout each §303(d)-listed stream; therefore, each monitoring site is a compliance point for the nutrient TMDLs.

Table 7. Assessment units with sediment (TSS) TMDLs.

Assessment Unit Name	Assessment Unit ID	Pollutants
Potlatch River - 6th Order	ID17060306CL044_06	Sediment
Cedar Creek - 4th Order	ID17060306CL046_04	Sediment
Pine Creek - Headwaters	ID17060306CL055_02	Sediment
Pine Creek - 3rd Order	ID17060306CL055_03	Sediment
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	Sediment
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	Sediment
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	Sediment
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	Sediment

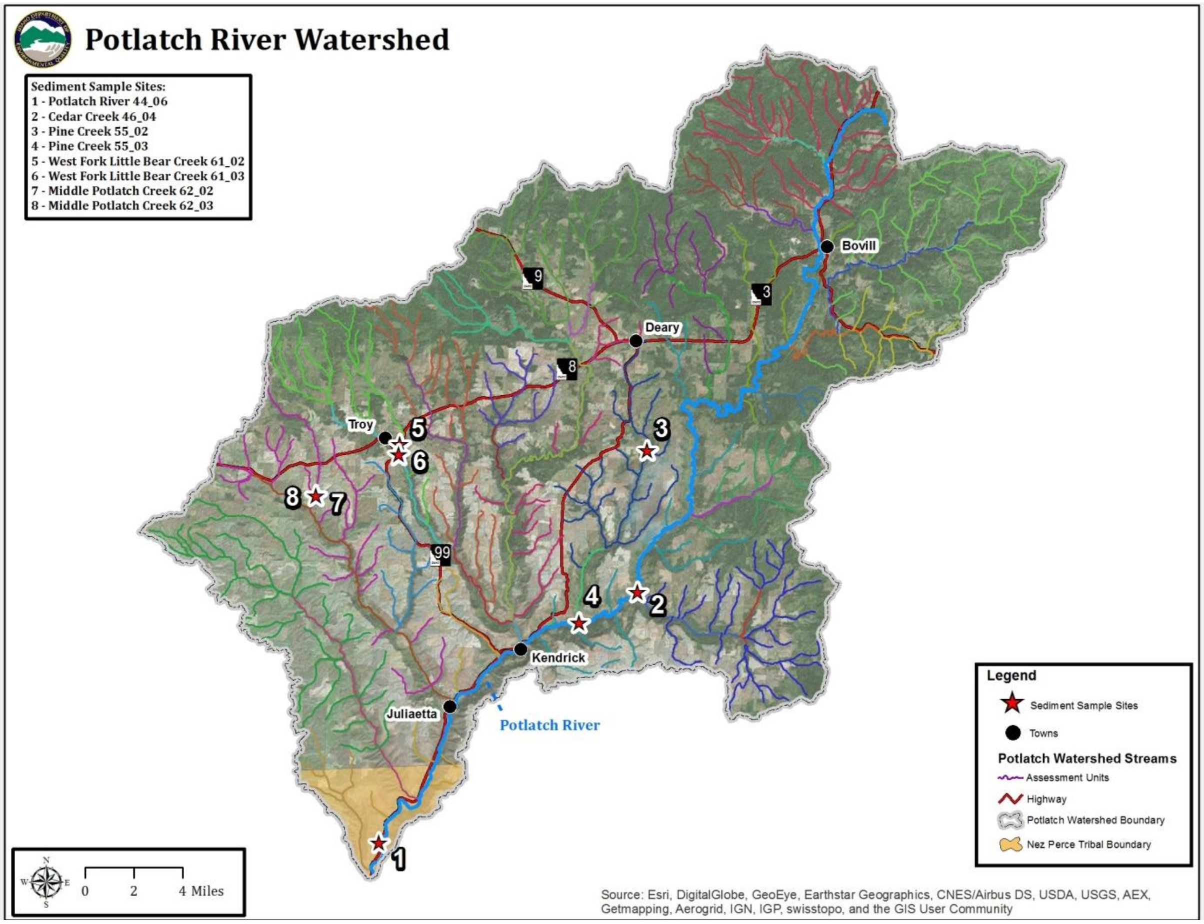

Figure 4. Sediment monitoring sites.

2.2.3.3 Load Capacity

The TSS load capacities are the product of the target concentration and flow. The sediment (TSS) load capacity was developed for each monitoring point using flow and sediment (TSS) data. For this review, existing pollutant loads were calculated per sample event for the listed streams in the Potlatch River TMDL (DEQ 2008). The equations below describe how the existing loads were generated.

Existing load (pounds per day) = sample concentration (mg/L) * flow (cfs) * 5.39

Load capacity (pounds per day) = target (mg/L) * flow (cfs) * 5.39

where

target = 80 mg/L daily TSS

5.39 = conversion factor (converts results to lb/day)

2.2.3.4 Load Allocation

Table 8–Table 15 list the existing sediment (TSS) concentrations calculated from measurements at the monitoring points established in the Potlatch River TMDL. The tables also show the load capacity; no load reductions were shown to be needed during the sampling events.

Table 8. Daily TSS load for Potlatch River - 6th Order (ID17060306CL044_06).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	92	ND	N/A	39,670.4	3,967.0	35,703.4
5/24/2016	158	ND	N/A	68,129.6	6,813.0	61,316.6
6/7/2016	61	ND	N/A	26,303.2	2,630.3	23,672.9
6/22/2016	34	ND	N/A	14,660.8	1,466.1	13,194.7
7/11/2016	35	ND	N/A	15,092.0	1,509.2	13,582.8

Notes: N/A = not applicable; ND = non-detect

Table 9. Daily TSS load for Cedar Creek - 4th Order (ID17060306CL046_04).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	5.58	3.4	102.3	2,406.1	240.6	2,165.5
5/24/2016	7.62	2.77	113.8	3,285.7	328.6	2,957.2
6/7/2016	1.82	3.38	33.2	784.8	78.5	706.3
6/22/2016	1.57	9.46	80.1	677.0	67.7	609.3
7/11/2016	1.164	1.89	11.9	501.9	50.2	451.7

Table 10. Daily TSS load for Pine Creek - Headwaters (ID17060306CL055_02).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	0.48	6.49	16.8	207.0	20.7	186.3
5/24/2016	0.9	6.77	32.8	388.1	38.8	349.3
6/7/2016	0.009	4.85	0.2	3.9	0.4	3.5
6/22/2016	Dry	N/A	N/A	N/A	N/A	N/A
7/11/2016	Dry	N/A	N/A	N/A	N/A	N/A

Notes: N/A = not applicable

Table 11. Daily TSS load for Pine Creek - 3rd Order (ID17060306CL055_03).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	1.42	7.11	54.4	612.3	61.2	551.1
5/24/2016	2.80	1.95	29.4	1,207.4	120.7	1,086.6
6/7/2016	0.69	3.22	12.0	297.5	29.8	267.8
6/22/2016	0.43	5.75	13.3	185.4	18.5	166.9
7/11/2016	0.46	4.46	11.1	198.4	19.8	178.5

Table 12. Daily TSS load for West Fork Little Bear Creek - 1st and 2nd Order (ID17060306CL061_02).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	1.02	2.82	15.5	439.8	44.0	395.8
5/24/2016	1.96	21.6	228.2	845.2	84.5	760.6
6/8/2016	0.59	13.2	42.0	254.4	25.4	229.0
6/23/2016	0.2	1.41	1.5	86.2	8.6	77.6
7/11/2016	0.2	1.48	1.6	86.2	8.6	77.6

Table 13. Daily TSS load for West Fork Little Bear Creek - 3rd Order (ID17060306CL061_03).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	2.71	3.31	48.3	1,168.6	116.9	1,051.7
5/24/2016	4.69	3.58	90.5	2,022.3	202.2	1,820.1
6/8/2016	0.94	4.09	20.7	405.3	40.5	364.8
6/23/2016	0.52	3.27	9.2	224.2	22.4	201.8
7/11/2016	0.50	5.15	13.9	215.6	21.6	194.0

Table 14. Daily TSS load for Middle Potlatch Creek - Headwaters (ID17060306CL062_02).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	0.18	2.81	2.7	77.6	7.8	69.9
5/24/2016	0.22	2.02	2.4	94.9	9.5	85.4
6/8/2016	0.026	1.54	0.2	11.2	1.1	10.1

Table 15. Daily TSS load for Middle Potlatch Creek - 3rd Order (ID17060306CL062_03).

Sample Date	Flow (cfs)	TSS (mg/L)	Existing Load (lb/day)	Load Capacity (lb/day)	MOS (lb/day)	Load Allocation (lb/day)
5/20/2016	3.22	1.84	31.9	1,388.5	138.8	1,249.6
5/24/2016	3.85	2.215	46.0	1,660.1	166.0	1,494.1
6/7/2016	1.61	2.04	17.7	694.2	69.4	624.8
6/22/2016	1.03	ND	N/A	444.1	44.4	399.7
7/11/2016	0.85	23.8	109.0	366.5	36.7	329.9

Notes: N/A = not applicable; ND = non-detect

2.2.3.5 Wasteload Allocation

Wasteload allocations were developed for Deary, Bovill, Kendrick, Juliaetta, and Troy WWTPs based on the estimated design flow times, maximum daily limit, and current allowable average monthly concentrations (Table 16). The equations below show how the maximum daily and average monthly load capacities were developed for the WWTP facilities.

> Daily Load Capacity (lb/day) = maximum daily limit (mg/L) * estimated design flow (mgd) * 8.34
>
> Average Monthly Load Capacity (lb/day) = average monthly limit (mg/L) * estimated design flow (mgd) * 8.34

where

> mgd = million gallons per day
>
> 8.34 = conversion factor (converts results to lb/day)

Table 16. TSS wasteload allocations for NPDES-permitted facilities in the Potlatch River watershed.

WWTP Facility	Assessment Unit	Maximum Daily Capacity (lb/day)	Monthly Average Load Capacity (lb/day)	Maximum Daily Allocation (lb/day)	Monthly Average Allocation (lb/day)
Deary	ID17060306CL056_02	153.5	84.4	138.1	76.0
Bovill	ID17060306CL048_04	33.4	18.8	30.1	16.9
Kendrick	ID17060306CL044_06	53.4	30.0	48.1	27.0
Juliaetta	ID17060306CL044_06	53.4	20.0	48.1	18.0
Troy	ID17060306CL061_03	126.8	47.5	114.1	42.8

More information on the wasteload allocations for WWTPs in the Potlatch River watershed can be found in section 5.3 of the Potlatch River TMDL (DEQ 2008).

2.2.3.6 Margin of Safety

An explicit MOS of 10% of the target load was deducted from the load and wasteload allocations to account for uncertainties about the relationship between instream dynamics and TSS concentrations.

3 Beneficial Use Status

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing, designated, and presumed uses. The *Water Body Assessment Guidance* (Grafe et al. 2002) gives a detailed description of beneficial use identification for use assessment purposes.

Existing uses under the CWA are "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Designated uses are specifically listed for Idaho water bodies in Idaho's water quality standards (IDAPA 58.01.02.003.27 and 58.01.02.109–.02.160 in addition to citations for existing and presumed uses).

Undesignated uses are to be designated. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called presumed uses, DEQ will apply the numeric cold water aquatic life criteria and primary or secondary contact recreation criteria to undesignated waters.

3.1 Beneficial Uses

Table 17 lists the AUs and associated beneficial uses and use support.

Table 17. Beneficial uses of TMDL water bodies.

Assessment Unit Name	Assessment Unit ID	Beneficial Uses	Type of Use	Use Support
Potlatch River - 6th Order	ID17060306CL044_06	COLD, PCR, SS, DWS	Designated	NFS (COLD, SS) FS (PCR) NA (DWS)
Potlatch River - 5th Order	ID17060306CL045_05	COLD, PCR, SS, DWS	Designated	NFS (COLD, SS) FS (PCR) NA (DWS)
Cedar Creek - 4th Order	ID17060306CL046_04	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS[a] (SCR)
Boulder Creek - 3rd Order	ID17060306CL047_03	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
Potlatch River - 4th Order	ID17060306CL048_04	COLD, PCR, SS, DWS	Designated	NFS (COLD, SS) FS (PCR) NA (DWS)

Assessment Unit Name	Assessment Unit ID	Beneficial Uses	Type of Use	Use Support
Potlatch River - 5th Order	ID17060306CL048_05	COLD, PCR, SS, DWS	Designated	NFS (COLD, SS) FS (PCR) NA (DWS)
Potlatch River - Headwaters	ID17060306CL049_02	COLD, PCR, SS, DWS	Designated	NFS (COLD, PCR, SS) NA (DWS)
Potlatch River - 3rd Order	ID17060306CL049_03	COLD, PCR, SS, DWS	Designated	NFS (COLD, PCR, SS) NA (DWS)
Potlatch River - 4th Order	ID17060306CL049_04	COLD, PCR, SS, DWS	Designated	NFS (COLD, PCR, SS) NA (DWS)
East Fork Potlatch River - 4th Order	ID17060306CL051_04	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS (SCR)
Ruby Creek - 3rd Order	ID17060306CL052_03	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
Moose Creek - Headwaters	ID17060306CL053_02	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
Moose Creek - 3rd Order	ID17060306CL053_03	COLD, PCR, SS	Presumed (COLD, PCR), Existing (SS)	NFS
Corral Creek - Headwaters	ID17060306CL054_02	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS (SCR)
Corral Creek - 3rd Order	ID17060306CL054_03	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS (SCR)
Pine Creek - Headwaters	ID17060306CL055_02	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS (SCR)
Pine Creek - 3rd Order	ID17060306CL055_03	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS (COLD, SS) FS (SCR)
Big Bear Creek - 4th Order	ID17060306CL056_04	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
Big Bear Creek - 5th Order	ID17060306CL056_05	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	COLD, SCR	Presumed	NFS
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	COLD, SCR, SS	Presumed (COLD, SCR), Existing (SS)	NFS
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	COLD, SCR, SS	Designated (COLD, SCR), Existing (SS)	NFS
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	COLD, SCR, SS	Designated (COLD, SCR), Existing (SS)	NFS

Notes: COLD = cold water aquatic life; DWS = domestic water supply; FS = fully supporting; NA = not assessed; NFS = not fully supporting; PCR = primary contact recreation; SCR = secondary contact recreation; SS = salmonid spawning
[a] = AU was assessed as full support in 2017 and will be included in the next integrated report cycle.

Beneficial uses are protected by a set of criteria, which include narrative criteria for pollutants such as sediment and nutrients and numeric criteria for pollutants such as bacteria, dissolved oxygen, pH, ammonia, temperature, and turbidity (IDAPA 58.01.02.250). Table 18 includes numeric criteria used in TMDLs; Figure 5 provides the stream assessment process for determining support status of the beneficial uses of cold water aquatic life, salmonid spawning, and contact recreation.

Table 18. Selected numeric criteria supportive of designated beneficial uses in Idaho water quality standards.

Parameter	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Aquatic Life	Salmonid Spawning[a]
Water Quality Standards: IDAPA 58.01.02.250–251				
Bacteria (cfu/100 mL)				
Geometric mean	<126	<126	—	—
Single sample	≤406	≤576	—	—
pH	—	—	6.5–9.0 s.u.	6.5–9.5 s.u.
Dissolved oxygen (DO)	—	—	DO exceeds 6.0 mg/L	**Water Column DO**: DO exceeds 6.0 mg/L in water column or 90% saturation, whichever is greater **Intergravel DO**: DO exceeds 5.0 mg/L for a 1-day minimum and exceeds 6.0 mg/L for a 7-day average
Temperature[b]	—	—	22 °C or less daily maximum; 19 °C or less daily average **Seasonal Cold Water**: Between summer solstice and autumn equinox: 26 °C or less daily maximum; 23 °C or less daily average	13 °C or less daily maximum; 9 °C or less daily average **Bull Trout**: Not to exceed 13 °C maximum weekly maximum temperature over warmest 7-day period, June–August; not to exceed 9 °C daily average in September and October
Turbidity	—	—	Turbidity not to exceed background by more than 50 nephelometric turbidity units (NTU) instantaneously or more than 25 NTU for more than 10 consecutive days	—
Ammonia	—	—	Ammonia not to exceed calculated concentration based on pH and temperature	—

Notes: °C = degree Celsius; cfu/100 mL = colony forming unit; s.u. = standard unit
[a] During spawning and incubation periods for inhabiting species
[b] Temperature exemption: Exceeding the temperature criteria will not be considered a water quality standard violation when the air temperature exceeds the 90th percentile of the 7-day average daily maximum air temperature calculated in yearly series over the historical record measured at the nearest weather reporting station.

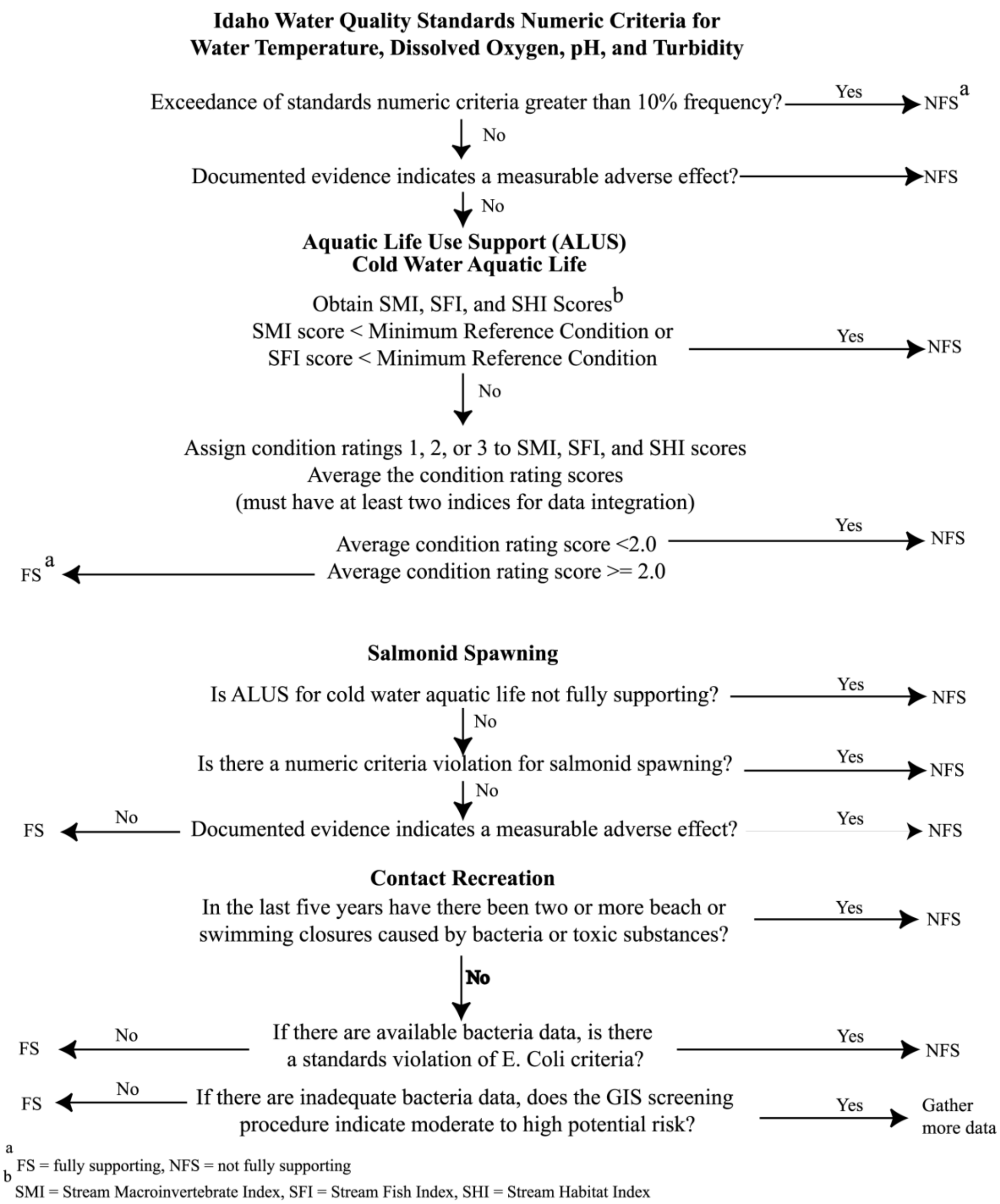

Figure 5. Determination steps and criteria for determining support status of beneficial uses in wadeable streams (Grafe et al. 2002).

3.2 Summary and Analysis of Current Water Quality Data

The data listed in section 2.2 were collected for this review. Table 19 provides the Beneficial Use Reconnaissance Program (BURP) data related to the cold water aquatic beneficial use support that were collected for this review.

Table 19. BURP data for the Potlatch River watershed.

Assessment Unit Name	Assessment Unit ID	SMI	SFI	SHI	Average	Current Integrated Report Category
Potlatch River - 6th Order	ID17060306CL044_06	1	1	2	1.33	4A, 4C
Potlatch River - 5th Order	ID17060306CL045_05	1	1	2	1.33	4A, 4C
Cedar Creek - 4th Order	ID17060306CL046_04	1	2	2	1.67	4A, 4C
Boulder Creek - 3rd Order	ID17060306CL047_03	3	3	3	3.00	4A
Potlatch River - 4th Order	ID17060306CL048_04	1	1	2	1.33	4A, 4C
Potlatch River - 5th Order	ID17060306CL048_05	1	1	2	1.33	4A, 4C
Potlatch River - Headwaters	ID17060306CL049_02	2	2	2	2.00	4A, 4C
Potlatch River - 3rd Order	ID17060306CL049_03	1	1	2	1.33	4A, 4C
Potlatch River - 4th Order	ID17060306CL049_04	1	1	2	1.33	4A, 4C
East Fork Potlatch River - 4th Order	ID17060306CL051_04	1	1	2	1.33	4A, 4C
Ruby Creek - 3rd Order	ID17060306CL052_03	2	2	2	2.00	4A, 4C
Moose Creek - Headwaters	ID17060306CL053_02	2	2	2	2.00	4A, 4C
Moose Creek - 3rd Order	ID17060306CL053_03	NA	NA	NA	Dry	4A, 4C
Corral Creek - Headwaters	ID17060306CL054_02	NA	NA	NA	Dry	4A
Corral Creek - 3rd Order	ID17060306CL054_03	NA	NA	NA	No Flow	4A
Pine Creek - Headwaters	ID17060306CL055_02	NA	NA	NA	Dry	4A, 4C
Pine Creek - 3rd Order	ID17060306CL055_03	NA	NA	NA	Dry	4A, 4C
Big Bear Creek - 4th Order	ID17060306CL056_04	1	NA	2	1.50[a]	4A
Big Bear Creek - 5th Order	ID17060306CL056_05	1	NA	2	1.50 [a]	4A
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	NA	NA	NA	NA	4A
West Fork Little Bear Creek - 3rd Order	ID17060306CL061_03	NA	NA	NA	Dry	4A
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	NA	NA	NA	Dry	4A, 4C
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	1	2	2	1.67	4A, 4C

Notes: NA = not assessed; SFI2 = stream fish index; SHI2 = stream habitat index; SMI2 = stream macroinvertebrate index
[a] Fish data missing from site due to high temperatures and dry conditions

4 Review of Implementation Plan and Activities

The *Potlatch River Subbasin Total Maximum Daily Load Implementation Plan for Agriculture* (ISCC 2010) outlined critical areas for project activities with input from watershed stakeholders and the WAG. Many watershed improvement projects with diverse funding sources have been completed or are ongoing in the Potlatch River watershed. Local watershed management agencies have worked together and with private landowners to implement best management practices (BMPs) to help restore the subbasin and prevent degradation.

Since the Potlatch River TMDL was approved by EPA in 2009, many projects have been implemented in the Potlatch River watershed to directly improve water quality and instream habitat. A summary of several of the restoration and improvement activities are included in the following sections.

4.1 Summary of Past and Present Pollution Control Efforts

4.1.1 Idaho Department of Fish and Game—Potlatch River Watershed Habitat Improvement Project (2007–2015)

From 2007–2015, the Idaho Department of Fish and Game (IDFG) began addressing limiting factors for steelhead within the Potlatch River basin. During this time, five projects were finished (Table 20, Figure 6), including instream habitat improvements, blockage barrier removal, floodplain reconnection, and riparian restoration.

Table 20. Habitat improvement summary.

Name	Year	Affected Length (miles)
Corral Creek	2007	5.0
Bloom Meadows	2009	1.0
Pine Creek	2011	9.0
Trout-Fry Meadows	2013	0.56
Bloom Creek	2014	0.25

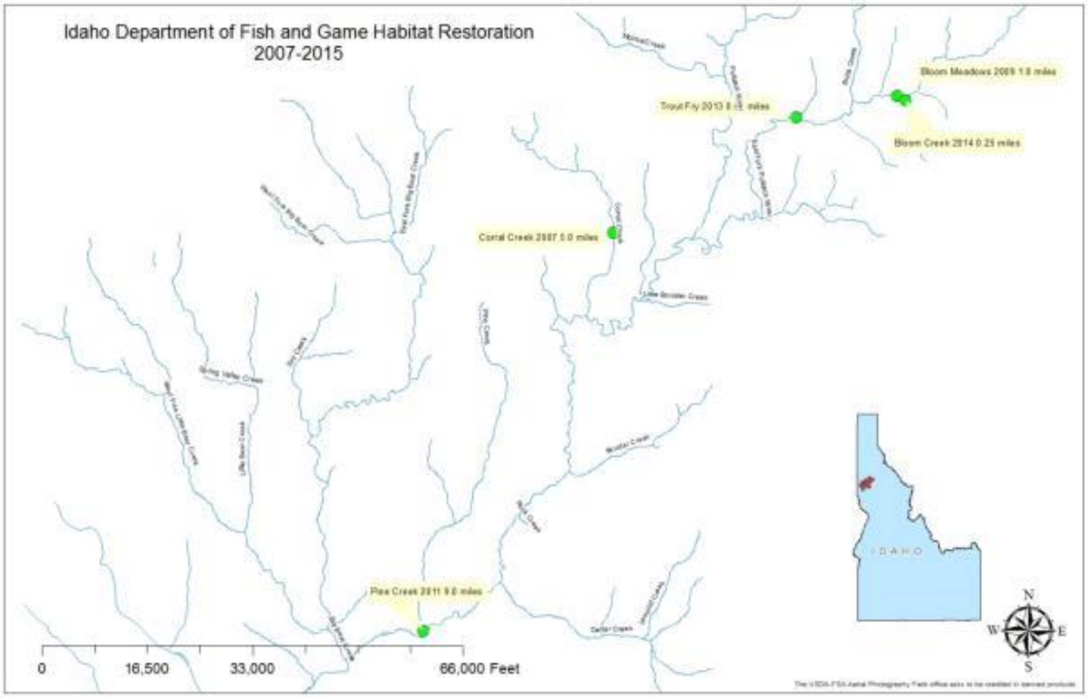

Figure 6. 2007–2015 IDFG completed Steelhead Habitat Projects in the upper East Fork Potlatch River.

2007 Corral Creek Culvert Removal

In 2003, a 300-foot-long concrete culvert housed in railway fill was identified as a barrier to upstream migrating steelhead in Corral Creek (Figure 7). The project site is owned by the Idaho Department of Lands (IDL). The culvert was blocking nearly 75% of the Corral creek drainage upstream, and removal began in August 2007 and took 5 months to complete. In 2008, over 14,000 trees and shrubs were planted at the site and a riparian enclosure fence was constructed (Figure 8).

Figure 7. Corral Creek—concrete box culvert and railway fill before removal (2003).

Figure 8. Corral Creek—concrete box culvert and railway fill site after removal (2007).

2009 East Fork Potlatch River (Bloom Meadows) Revegetation

Implementation of the project began in September 2009. The project site is owned by the Potlatch Corporation. Large woody debris (LWD) structures were installed at 47 sites within the East Fork, along approximately 1 mile of this stream reach (Figure 9). Structure composition included 100 root wads, 25 barb logs, and 20 tree tops. This phase of the implementation took approximately 2 weeks to complete. Photo points were taken to evaluate structure integrity and function.

Sites were revegetated in fall 2009 and fall 2010, and additional revegetation took place in spring 2011. Revegetation consisted of a combination of spruce, white fir, and cedar planted in uplands areas at a rate of approximately 400 trees/acre. In 2010, channel cross-sections were recorded at 25 sites and resurveyed in 2012 and 2016 (Figure 10). Structure shocking sites were also set up in 2010 and have been resurveyed annually since 2012 to assess juvenile *Oncorhynchus mykiss* presence and seasonal density shifts. This entire project has a riparian enclosure fence surrounding it that is maintained annually by IDFG personnel.

Figure 9. East Fork Potlatch River—LWD structure installed in Bloom Meadows (2010).

Figure 10. East Fork Potlatch River—LWD structure 6 years after installation (2016).

2011 Pine Creek Bridge Replacement

The Pine Creek Bridge was identified as a low water barrier for upstream migrating steelhead (Figure 11). The concrete pad supporting the bridge pillars had deteriorated over time causing blockage at low water flows. During the 1996–1997 winter, flooding caused gravel, cobble, and rubble to be deposited at the site. To prevent future flood concerns and protect the bridge, the US Army Corps of Engineers straightened the stream channel and pushed the materials to the stream sides, which filled in the bedrock pools and formed berms along the stream channel. The stream channel was historically filled with this material, causing the river to flow in a very wide but shallow channel. In 2011, a free-span bridge was installed that eliminate the low water barrier (Figure 12).

Figure 11. Pine Creek—Old bridge with several bridge pillars creating passage barrier (2010).

Figure 12. Pine Creek—New free-span bridge installed (2011).

2013 East Fork Potlatch River (Trout-Fry Meadows)

This project is located in a 54-acre privately owned meadow and includes 0.67 mile of the East Fork Potlatch River. The area is currently enrolled in the Natural Resources Conservation Service's Conservation Reserve Program. Prior to enrollment, the area was extensively grazed, which has had detrimental effects on the meadow and the stream channel. The stream had a bed that was primarily composed of gravels and cobbles. It was low gradient and heavily incised, which resulted in continuous input of sands and silts. The channel has a history of avulsion from beaver activity, and recent aerial photos revealed several side channels, floodways, and abandoned channels on the floodplain. The goal of the project was to improve steelhead spawning and rearing habitat, reconnect the floodplain, and retain floodwaters.

During summer 2012, a triple-pass electrofishing survey was conducted at three sites within the Trout-Fry Meadows on the East Fork Potlatch River to establish fish density, fish community, and fish distribution prior to a habitat restoration project scheduled for fall 2013. Implementation began in September 2013, and the project lasted about 5 weeks. Of the 0.67 mile, about 40% of the historical stream channel was reconnected with the existing channel (Figure 13–Figure 15). LWD structures were installed at 34 sites; 18 were installed in the newly reconnected historical channel and 16 in the current channel. The LWD structures were made up of 300 logs with root wads attached. Structure composition included single tree barbs, engineered three- to five-member log jams, root wad bank stabilization, and one permanent channel plug. In 2013, a habitat survey was conducted and included an LWD survey, pebble counts, and pool density. Revegetation took place in November 2013 and continued into spring and fall 2014. A combination of sedges, rushes, willows, and Hawthorne were planted. In 2014, the entire project site was enclosed by a barbed wire fence. The project site was sprayed for weeds in 2015.

Figure 13. East Fork Potlatch River—Newly constructed channel in Trout-Fry Meadows (October 7, 2013).

Figure 14. East Fork Potlatch River—Newly constructed channel in Trout-Fry Meadows (October 10, 2013).

Figure 15. East Fork Potlatch River—Newly constructed channel during a high-flow event in Trout-Fry Meadows (March, 6, 2014).

2014 Bloom Creek, East Fork Potlatch River

This project is located adjacent to the 2009 Bloom meadows project on the main stem East Fork Potlatch River. Bloom Creek is a tributary that drains into the East Fork Potlach River at Bloom meadows. The project site is owned by IDL. The project goal was to enhance habitat for all life stages of steelhead within the project reach. Some of the project objectives were to address the issues/problems associated with channel alignment, stream complexity, lack of LWD, pool ratio, and sediment deposition. At the start of the project, the channel had deviated from its historical channel in some areas. This was most likely due to the placement of a sawmill dam around 1931. There was a lack of pool-riffle-run setups with little to no woody debris. The substrate composition shifted from cobbles/gravels/fines below the mill dam to mostly fines above the dam site. The stream channel was showing some sinuosity where it had deviated from its historical location but was not severely channelized. The addition of LWD was expected to greatly increase stream complexity (Figure 16, Figure 17), thus providing additional summer and winter habitat for rearing juveniles.

Fish surveys were first conducted in the project reach in 2012 and again in 2015 following the completion of the project. Steelhead densities in 2012 were nearly four times higher than brook trout below the dam site, and brook trout densities were much higher at both sites above the dam site. In 2015, densities were nearly equal for both species below the dam and no steelhead were collected above the dam.

In fall 2014, 24 post-assisted log structures (PALS) were installed by hand in Bloom Creek to improve instream habitat and channel complexity (Figure 18, Figure 19). This low-impact method was chosen because Bloom Creek is a small, low-gradient system that does not require the larger diameter LWD that is typically installed by an excavator. Instead, smaller diameter LWD was installed by hand with little to no disturbance at a much lower cost. These structures were expected to increase the instream habitat complexity and improve steelhead trout (*Oncorhynchus mykiss*) habitat by creating juvenile rearing habitat and improving water quality. A pneumatic post pounder and air compressor were used to drive 3- to 4-inch wooden posts to a depth of 60–90 centimeters into the stream bed, pinning the LWD pieces together, and forming a structure. Eighteen structures were placed instream to constrict the flow of water resulting in channel scour, pool formation, and sediment transport. Six structures were built for bank stabilization. Revegetation of this site occurred in fall 2014 and included 500 trees and shrubs, 25 pounds of clover seed, and 100 pounds of native grass seed. Channel cross-sections were recorded at four sites. Extensive stream flow and temperature monitoring has taken place since 2012.

Figure 16. Bloom Creek—Excavation and shaping of eroding vertical bank (September 26, 2014).

Figure 17. Bloom Creek—Bank with LWD structures and revegetation (September 30, 2014).

Figure 18. Bloom Creek—Location of a PALS structure prior to installation (2014).

Figure 19. Bloom Creek—Location with a completed PALS structure (2014).

4.1.2 Latah Soil and Water Conservation District

The 380,000-acre Potlatch River watershed is considered a priority watershed for wild steelhead habitat. This project coordinated wild steelhead habitat restoration with load reductions to meet Idaho's water quality standards.

In 2008, the Latah Soil and Water Conservation District (Latah SWCD) developed a 5-year/5-phase approach to support implementation of Latah SWCD's *Potlatch River Watershed Management Plan* (Resource Planning Unlimited 2007). The *Potlatch River Watershed Management Plan* is designed to restore Endangered Species Act-listed Snake River wild steelhead habitat in prioritized subwatersheds throughout the Potlatch River watershed. The *Potlatch River Watershed Management Plan* is a complementary component of the *Clearwater Subbasin Management Plan* adopted by the Northwest Power and Conservation Council's Fish and Wildlife Program. The purpose of the *Potlatch River Watershed Management Plan* is to provide landowners, land managers, and conservation agency staff with a detailed outline to facilitate the collaborative coordination of steelhead habitat restoration and protection efforts throughout the Potlatch River watershed. The *Potlatch River Watershed Management Plan* defines priority restoration and protection strategies within individual subwatersheds and their respective land types (i.e., canyon, agricultural uplands, and forest).

The proposed BMPs within the *Potlatch River Watershed Management Plan* address a multitude of habitat issues that are consistent with the BMPs relevant to addressing the water quality concerns associated with nonpoint source pollution issues within the Potlatch River TMDL and the associated *Potlatch River Subbasin Total Maximum Daily Load Implementation Plan for Agriculture*.

The program developed by Latah SWCD and submitted for DEQ's consideration was designed to address TMDL water quality parameters that were determined to have an effect on wild steelhead habitat throughout the Potlatch River watershed; sediment and temperature were primary concerns. The program was developed to address watershed issues, as a whole, as opposed to individual project sites predetermined at the time Latah SWCD submitted annual applications to DEQ's CWA §319 nonpoint source program.

Over the life of this 5-year program, the Latah SWCD anticipated spending CWA §319 funding on approximately 40 individual restoration sites throughout the Potlatch River watershed. To date, this program has reported load reductions on 25 individual restoration projects. The majority of funding for the full implementation of these restoration project sites originated with federal and state funding outside the CWA §319 program. Most of the project sites had a mixture of interagency funding over multiple years. In addition, many of the individual projects were implemented using CWA §319 funds from multiple DEQ contracts.

In an effort to account for load reduction estimates per individual DEQ contract, each of the projects were assigned to an individual contract for the purpose of estimating TMDL load reductions. This assignment kept load reduction estimates from being counted multiple times if funding to complete the individual restoration projects spanned multiple DEQ contracts.

Given the necessity to combine multiple funding sources over several years and between multiple DEQ contracts, actual DEQ funding expenditures for each of the restoration sites were not tallied within these individual final contract reports. DEQ funded five separate contracts to the Latah SWCD for the implementation of this 5-year/5-phase program. The individual contracts are shown in Table 21.

Table 21. Summary of program phases and contracts.

Program Phase	Application #	Subgrant #	§319 Funds Awarded	Contract Start Date	Contract End Date
I	LRO1100269	S310	$205,208	06/15/2009	12/31/2013
II	LEW1100189	S396	$207,302	06/01/2010	12/31/2014
III	LRO1100250	S425	$207,523	07/25/2011	12/31/2015
IV	LRO1200300	S460	$207,302	08/13/2012	12/31/2016
V	LRO1300342	S491	$207,674	08/06/2013	05/31/2017

Numerous agencies have supported the restoration/protection efforts outlined in the *Potlatch River Watershed Management Plan*. Agencies and organizations that have committed funding and/or staff resources include the following:

- Bonneville Power Administration
- IDFG
- IDL
- Idaho Office of Species Conservation
- Idaho Soil and Water Conservation Commission
- Idaho State Department of Agriculture
- Idaho Transportation Department
- National Oceanic and Atmospheric Administration—Fisheries
- Potlatch Forest Holdings, Inc.
- North Latah County Highway District
- US Department of Agriculture Forest Service
- US Department of Agriculture Natural Resources Conservation Service

Phase I Subgrant #S310 Summary

Phase I (Subgrant #S310) was initiated on June 15, 2009, and expired on December 31, 2013. The subgrant was funded for $205,028, and the funds were fully expended. In 2012, DEQ reviewed eight projects for the purposes of modeling TMDL load reductions for sediment, nitrogen, and phosphorus. Seven of the projects were assigned to this Phase I contract. The forest road rocking project within the East Fork Potlatch River was assigned to Phase II.

Total load reductions for the seven projects assigned to this project include 1,851 tons of sediment, 6,241 pounds of nitrogen, and 3,024 pounds of phosphorus (Table 22). The BMPs developed within this project include bank stabilization, road abandonment, road rocking, channel realignment, and livestock exclusion fencing.

Table 22. Sediment and nutrient load reduction estimates for Phase I (S310).

Project	Sediment (tons)	Nitrogen (pounds)	Phosphorus (pounds)
Railroad Culvert Removal and Bank Stabilization—Corral Creek	288	1,239	523
Road Abandonment—Corral Creek	12	38	19
Road Rocking—Corral Creek	10	32	16
Channel Realignment—Corral Creek/Round Meadow	449	1,436	719
Channel Realignment—Corral Creek/Tee Meadow	223	715	357
Channel Realignment—Corral Creek/Forest	334	1,070	535
Livestock Exclusion—Corral Creek	535	1,711	855
Total	1,851	6,241	3,024

Phase II Subgrant #S396 Summary

Phase II (Subgrant #S396) was initiated on June 1, 2010, and expired on December 31, 2014. The subgrant was funded for $207,302, and the funds were fully expended. In 2014, DEQ reviewed eleven projects for the purposes of modeling TMDL load reductions for sediment, nitrogen, and phosphorus. Nine of the projects assigned to this Phase II contract were modeled by DEQ for load reductions, and two of the road rocking projects (Pivash Creek and Rogers Creek) were modeled by the Latah SWCD staff using similar assumptions from DEQ's modeling efforts.

Total load reductions for the eleven projects assigned to this project include 3,111 tons of sediment, 9,927 pounds of nitrogen, and 4,890 pounds of phosphorus (Table 23). The BMPs developed within this project include riparian plantings and bank stabilization, road rocking and culvert replacements, channel realignment and meadow restoration, and livestock exclusion fencing.

Table 23. Sediment and nutrient load reduction estimates for Phase II (S396).

Project	Sediment (tons)	Nitrogen (pounds)	Phosphorus (pounds)
Big Bear Creek—Floodplain/Meadow Restoration (Phase I/Cells 1&2)	140	433	184
Big Bear Creek—Livestock Exclusion Fencing and Riparian Plantings	145	469	221
Big Bear Creek—Riparian Plantings	317	1,019	496
Big Bear Creek—Deer Creek Road Culvert Replacement	36	114	57
Boulder Creek—Riparian Plantings	151	457	222
E. Fork Potlatch River—Jackson Creek Road Rocking and Culverts	14	45	22
E. Fork Potlatch River—Pivash Creek Road Rocking	331	1,059	530
E. Fork Potlatch River—Rogers Creek Road Rocking	1,068	3,418	1,709
E. Fork Potlatch River—Corduroy Channel Stabilization	92	298	142
E. Fork Potlatch River—Bobs Creek Road Rocking and Culverts	309	989	494
E. Fork Potlatch River—Mallory Creek Road Rocking and Culverts	508	1626	813
Total	3,111	9,927	4,890

Phase III Subgrant #S425 Summary

Phase III (Subgrant #425) was initiated on July 25, 2011, and expired on December 31, 2015. The subgrant was funded for $207,523, and the funds were fully expended. Latah SWCD reviewed seven projects for the purposes of modeling TMDL load reductions for sediment, nitrogen, and phosphorus.

Total load reductions for the seven projects assigned to this project include 556 tons of sediment, 1,863 pounds of nitrogen, and 925 pounds of phosphorus (Table 24). The BMPs developed within this project include riparian plantings and bank stabilization, road rocking and culvert replacements, road obliteration, channel realignment and meadow restoration, and livestock exclusion fencing.

Table 24. Sediment and nutrient load reduction estimates for Phase III (S425).

Project	Sediment (tons)	Nitrogen (pounds)	Phosphorus (pounds)
Big Bear Creek—Floodplain/Meadow Restoration (Phase I/Cell 3)	8	26	8
Corral Creek—Racetrack Meadow Restoration	55	176	88
WF Little Bear Creek—Dutch Flat Dam Riparian Restoration	6	19	9
Purdue Creek—Road Obliteration	30	179	89
E. Fork Potlatch River—Experimental Road Rocking	298	954	477
E. Fork Potlatch River—Baker Road Rocking	60	192	96
E. Fork Potlatch River—Jones Creek Road Rocking	99	317	158
Total	556	1,863	925

4.1.3 US Forest Service

From 2010 to 2016, the US Forest Service (USFS) decommissioned 16.8 miles of road in the Potlatch River watershed and placed 1.3 miles of road into storage. Additionally, the USFS worked with the Latah SWCD on a project on West Fork Corral Creek and with the Palouse-Clearwater Environmental Institute on a project on an unnamed tributary to Hog Meadow Creek.

4.1.4 Idaho Department of Lands

From 2008 to 2016, IDL completed 43 stream channel alteration projects (Table 25), including culvert removal and replacement, bridge installations, and bank stabilization in the Potlatch River watershed. These projects help to reduce sediment input into the system as well as provide adequate fish passage.

Table 25. IDL stream channel alteration in the Potlatch River watershed 2008–2016.

Location	Landowner	Project Description	Year Completed
N46.8774 W116.2331	Potlatch Forest Holdings, Inc.	81" x 59" squash pipe Installation	2008
N46.9697 W116.5813	Potlatch Forest Holdings, Inc.	Replace undersize pipe with 81" x 59" squash pipe	2008
N46.86655 W116.6523	Potlatch Forest Holdings, Inc.	Replace undersize pipe with 81" x 59" squash pipe	2008
N46.8796 W116.2357	Potlatch Forest Holdings, Inc.	Steel bridge installation	2008
N46.8957 W116.246	Potlatch Forest Holdings, Inc.	Replace 18" CMP with 30" CMP, rip-rap inlet/outlet and grass seed	2009
N46.8961 W116.3908	Sean Wilson	Bridge less than 75' in length on eco blocks with rip-rap	2010
N46.8664 W116.3236	Potlatch Forest Holdings, Inc.	Removal of undersized culvert	2010
N46.8722 W116.3208	Potlatch Forest Holdings, Inc.	Removal of undersized culvert	2010
N46.8872 W116.3225	Potlatch Forest Holdings, Inc.	Removal of undersized culvert	2010
N46.8664 W116.3236	Potlatch Forest Holdings, Inc.	Installation of 35' bridge	2010
N46.8600 W116.2833	Potlatch Forest Holdings, Inc.	Temporary culvert 36' in 1300 acre drainage to be in place for 2–3 Weeks during frozen conditions	2011
N46.7683 W116.5997	Joyce & Mike Pitkin	Reuse of an existing ford meeting FPA requirements	2011
N46.8619 W116.2900	Potlatch Forest Holdings, Inc.	Removal of old, temporary crossings	2011
N46.8075 W116.6592	City of Troy	Install of 3 culverts, 18" CMP in headwater draws	2011
N46.8328 W116.8275	Bennett Lumber Products, Inc.	Install 96" (100" x 71") squash pipe with excavator with armored inlet	2012

Location	Landowner	Project Description	Year Completed
N46.8431 W116.4612	Scott & Patti Hansen	Install 81' x 59' x 36' squash pipe	2013
N46.86742 W116.3255	Potlatch Forest Holdings, Inc.	Oversize and embed 48" x 44' culvert at 2% gradient or less	2013
N46.87669 W116.3219	Potlatch Forest Holdings, Inc.	30" x 55' reskew culvert	2013
N46.89095 W116.3237	Potlatch Forest Holdings, Inc.	36" x 42' culvert at flowline of channel	2013
N46.89677 W116.3232	Potlatch Forest Holdings, Inc.	48" x 38' oversize and embed culvert at 2% gradient or less	2013
N46.8988 W116.3180	Potlatch Forest Holdings, Inc.	18" x 38' reskew culvert	2013
N46.90088 W116.3133	Potlatch Forest Holdings, Inc.	48" x 38' oversize and embed culvert at 2% gradient or less	2013
N46.88856 W116.2657	Potlatch Forest Holdings, Inc.	66" x 64' oversize and embed culvert at 1% gradient	2013
N46.89226 W116.2631	Potlatch Forest Holdings, Inc.	Remove existing culvert install bridge	2013
N46.89291 W116.2625	Potlatch Forest Holdings, Inc.	Remove existing culvert install bridge	2013
N46.89656 W116.2514	Potlatch Forest Holdings, Inc.	48" x 60' oversize and embed culvert at 2% gradient or less	2013
N46.85947 W116.2899	Potlatch Forest Holdings, Inc.	Remove and replace existing bridge	2013
N46.9228 W116.4261	Henry Stout Et. Al.	54" CMP removal and new 54" CMP installed to meet fish passage requirements and removal of double pipe at second location.	2014
N46.9236 W116.4278	Henry Stout Et. Al.	Removal of double pipe and replace with a 66" CMP fish passable	2014
N46.8897 W116.3179	Potlatch Forest Holdings, Inc.	24" CMP with two parallel subdrains	2015
N46.7069 W116.5539	Walter Mallory Trust/Warren Case	Ford	2015
N46.724 W116.548	IFG Timber, LLC	Temporary culvert, two 24" x 20' CMPs	2015
N46.9005 W116.3136	Potlatch Forest Holdings, Inc.	50' metal bridge with concrete sill	2015
N46.9002 W116.3005	Potlatch Forest Holdings, Inc.	42" CMP	2015
N46.8352 W116.2675	Potlatch Forest Holdings, Inc.	54" squashed CMP, embedded pipe for 48" equivalent CMP	2015
N46.8936 W116.2761	Potlatch Forest Holdings, Inc.	48" imbedded	2015
N46.8469 W116.2627	Potlatch Forest Holdings, Inc.	Install 30" CMP	2016
N46.8479 W116.2621	Potlatch Forest Holdings, Inc.	Install 36" CMP	2016
N46.8459 W116.2620	Potlatch Forest Holdings, Inc.	Install 30" CMP	2016

Location	Landowner	Project Description	Year Completed
N46.8478 W116.2607	Potlatch Forest Holdings, Inc.	Install 30" CMP	2016
N46.8451 W116.2534	Potlatch Forest Holdings, Inc.	Install 24" CMP	2016
N46.8851 W116.2634	Potlatch Forest Holdings, Inc.	Remove 30" CMP	2016
N46.8966 W116.2526	Potlatch Forest Holdings, Inc.	Remove 30" CMP	2016

Note: CMP = corrugated metal pipe

4.1.5 Idaho Department of Transportation

The Idaho Department of Transportation (ITD) has completed or provided funding for five projects in the Potlatch River watershed. ITD replaced a culvert on Howard Gulch (mile marker 0.68, SH-3) to accommodate fish passage. In conjunction with the USFS, they replaced a culvert on Purdue Creek (SH-3) and provided the Latah SWCD with funding for structure removal in Corral Creek near Helmer to aid in fish passage. One bank stabilization project (mile marker 6.9, SH-3) was completed. Two projects are ongoing, a bank stabilization project above Big Bear Creek near Kendrick (mile marker 13.5, SH-3) and a fish passage project with IDFG near Troy on Big Meadow Creek. Two projects are in design and being planned for the near future, including bank stabilization and a bridge replacement.

4.2 Natural Resource Partnerships

Since 2008, pollution control efforts within the Potlatch River watershed have been examined according to land use and activities, which are divided between point and nonpoint sources. Table 26 lists the designated management agencies, natural resource responsibility represented, and type of involvement.

Table 26. Natural resource partnerships.

Designated Management Agency	Resource Responsibility	Type of Involvement (regulatory, funding, and assistance)
Idaho Soil and Water Conservation Commission	Agriculture, grazing, forestry, roads, and wetlands	Funding and technical and administrative assistance
Latah SWCD	Agriculture, grazing, forestry, roads, and wetlands	Funding and technical and administrative assistance
IDL	Grazing, forestry, and roads	Regulatory, matching funds, and technical oversight
Potlatch Corporation	Grazing, forestry, and roads	Matching funds and technical oversight
ITD	Roads	Matching funds and technical oversight
Private Landowners	Agriculture, grazing, and forestry	Matching funds
IDFG	Fish and wildlife	Matching funds and technical oversight
Natural Resource Conservation Service	Agriculture	Matching funds and technical oversight

5 Summary of Five-Year Review

Using the pollutant targets established in the Potlatch River TMDL, pollutant loads in listed streams are generally improving. Bacteria sampling at thirteen monitoring points established in the Potlatch River TMDL showed that six sites needed no load reduction during the spring, summer, and fall sampling events and seven sites needed load reductions ranging from 2% to 79% during the summer or fall sampling periods (Table 3).

Nutrient sampling at two monitoring points established in the Potlatch River TMDL in the Pine Creek AUs showed both sites needed no load reduction for TP (Table 6). An ecohydrological analysis of steelhead habitat in West Fork Little Bear Creek (Sánchez-Murillo et al. 2013) showed it to be the most productive juvenile steelhead stream in the Potlatch River drainage and found it had the capacity to accept and benefit from high nutrient loads from the WWTP and a loss of the flow, currently provided by the effluent from the City of Troy WWTP, could negatively impact existing steelhead populations. The city of Troy committed to further sampling to provide data for the renewal of their NPDES permit.

Sediment sampling at eight monitoring points established in the Potlatch River TMDL showed all eight sites needed no load reductions (Table 8–Table 15).

5.1 Water Quality Trend

Overall, while pollutant loads have improved in the watershed, water quality and the current biological condition of AUs as determined by BURP data has not significantly changed in the Potlatch River watershed since the Potlatch River TMDL was approved. In most cases, AUs listed in the Potlatch River TMDL are not supporting beneficial uses (Table 17). Many watershed improvement projects have been completed or are ongoing in the Potlatch River watershed. Local watershed management agencies have worked together and with private landowners to implement best management practices (BMPs) to help restore the subbasin and prevent degradation including projects to reduce sediment and nutrient runoff which can also reduce *E. coli* impacts. For more information about specific projects, see Section 4 of this document. Table 27 shows six AUs in the Potlatch River watershed that are supporting recreational beneficial uses.

Table 27. Summary of recommended changes for AUs based on TMDL review.

Assessment Unit Name	Assessment Unit Number	Pollutant	Recommended Changes to Next Integrated Report	Justification
Potlatch River - 3rd Order	ID17060306CL049_03	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.
Big Bear Creek - 4th Order	ID17060306CL056_04	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.
Big Bear Creek - 5th Order	ID17060306CL056_05	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.
West Fork Little Bear Creek - 1st and 2nd Order	ID17060306CL061_02	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.
Middle Potlatch Creek - Headwaters	ID17060306CL062_02	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.
Middle Potlatch Creek - 3rd Order	ID17060306CL062_03	Bacteria (*E. coli*)	Move from Category 4a to 2 for bacteria (*E. coli*)	Data show 126 cfu/100 mL geometric mean criterion is being met; AU fully supports contact recreation beneficial use.

5.2 Review of Pollutant Targets

The Potlatch River TMDL included targets for sediment, *E. coli*, and nutrients. No changes to the pollutant targets are recommended at this time.

5.3 Review of Beneficial Uses

Seven AUs included in this TMDL are designated for cold water aquatic life, salmonid spawning, contact recreation, and domestic water supply beneficial uses. Two AUs are designated for cold water aquatic life and contact recreation beneficial uses. Fourteen AUs have presumed cold water aquatic life and contact recreation beneficial uses. Fifteen AUs have an existing use for salmonid spawning beneficial uses (Table 17). No changes to the beneficial use designations are recommended.

5.4 Watershed Advisory Group Consultation

This review was developed with participation from the Potlatch River WAG. Meeting dates were as follows:

- June 1, 2017—Potlatch River WAG structuring and TMDL introduction
- June 29, 2017— Potlatch River TMDL temperature/PNV methodology review
- August 24, 2017 – Potlatch River TMDL Review and Implementation

5.5 Recommendations for Further Action

This review complies with Idaho Code §39-3611(7), and DEQ will continue to review and reevaluate the Potlatch River TMDL and all available data periodically. The implementation plan will be updated to reflect the observations and results in this review, and the designated management agencies will continue to work with landowners on riparian restoration.

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Appendix A. Bacteria Data

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
Boulder Creek - 3rd Order ID17060306CL047_03		
4/21/2016	41.3	--
4/25/2016	27.2	--
5/2/2016	21.6	--
5/9/2016	48.7	--
5/12/2016	33.1	33
7/21/2016	48	--
7/25/2016	21.1	--
7/28/2016	238.2	--
8/1/2016	1119.9	--
8/4/2016	238.2	145
9/26/2016	36.9	--
9/29/2016	93.3	--
10/3/2016	26.2	--
10/6/2016	122.3	--
10/13/2016	18.7	46
Potlatch River - Headwaters ID17060306CL049_02		
4/21/2016	41.9	--
4/25/2016	20.3	--
5/2/2016	4.1	--
5/9/2016	14.6	--
5/12/2016	1	9
7/21/2016	93.3	--
7/25/2016	435.2	--
7/28/2016	116.2	--
8/1/2016	88.2	--
8/4/2016	86.5	129
9/26/2016	204.6	--
9/29/2016	2419.6	--
10/3/2016	816.4	--
10/6/2016	1203.3	--
10/13/2016	155.3	597
Potlatch River - 3rd Order ID17060306CL049_03		
4/21/2016	3.1	--
4/25/2016	3.1	--
5/2/2016	5.2	--
5/9/2016	4.1	--

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
5/12/2016	16.9	5
7/21/2016	71.35	--
7/25/2016	201.4	--
7/28/2016	218.7	--
8/1/2016	98.8	--
8/4/2016	44.8	107
9/26/2016	40.65	--
9/29/2016	31.5	--
10/3/2016	4.1	--
10/6/2016	35.85	--
10/13/2016	34.1	23
Potlatch River - 4th Order ID17060306CL049_04		
4/21/2016	3.1	--
4/25/2016	24.9	--
5/2/2016	17.1	--
5/9/2016	365.4	--
5/12/2016	137.6	37
7/21/2016	214	--
7/25/2016	261.3	--
7/28/2016	325.5	--
8/1/2016	52	--
8/4/2016	53.8	138
9/26/2016	272.3	--
9/29/2016	41.4	--
10/3/2016	45.7	--
10/6/2016	110	--
10/13/2016	313	112
Ruby Creek - 3rd Order ID17060306CL052_03		
4/21/2016	9.7	--
4/25/2016	5.2	--
5/2/2016	1	--
5/9/2016	18.9	--
5/12/2016	16	7
7/21/2016	73.8	--
7/25/2016	15.85	--
7/28/2016	160.7	--
8/1/2016	186	--
8/4/2016	275.5	99
9/26/2016	110.6	--

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
9/29/2016	37.9	--
10/3/2016	1046.2	--
10/6/2016	52.1	--
10/13/2016	64.8	108
Moose Creek - Headwaters ID17060306CL053_02		
4/21/2016	2	--
4/25/2016	3	--
5/2/2016	6.3	--
5/9/2016	10.8	--
5/12/2016	18.5	6
7/21/2016	980.4	--
7/25/2016	45.7	--
7/28/2016	60.05	--
8/1/2016	155.3	--
8/4/2016	116.2	137
9/26/2016	29.2	--
9/29/2016	53.8	--
10/6/2016	155.3	--
10/13/2016	95.9	--
10/18/2016	44.1	63
Moose Creek - 3rd Order ID17060306CL053_03		
4/21/2016	2	--
4/25/2016	1	--
5/2/2016	23.1	--
5/9/2016	29.2	--
5/12/2016	21.8	8
7/21/2016	42	--
7/25/2016	2419.6	--
7/28/2016	2419.2	--
8/1/2016	101.9	--
8/4/2016	142.1	324
9/26/2016	209.8	--
9/29/2016	129.6	--
10/3/2016	139.45	--
10/6/2016	83.6	--
10/13/2016	25.3	96
Big Bear Creek - 4th Order ID17060306CL056_04		
4/21/2016	12.2	--
4/25/2016	11	--

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
5/2/2016	7.4	--
5/9/2016	16	--
5/12/2016	13.5	12
7/21/2016	10.8	--
7/25/2016	30.1	--
7/28/2016	27.9	--
8/1/2016	8.5	--
8/4/2016	4.1	13
9/26/2016	81.3	--
9/29/2016	42.2	--
10/3/2016	11	--
10/6/2016	57.6	--
10/13/2016	46.4	40
Big Bear Creek - 5th Order ID17060306CL056_05		
4/21/2016	2	--
4/25/2016	1	--
5/2/2016	7.4	--
5/9/2016	9.15	--
5/12/2016	10.9	4
7/21/2016	13.5	--
7/25/2016	15.8	--
7/28/2016	8.5	--
8/1/2016	14.6	--
8/4/2016	126.35	20
9/26/2016	52.8	--
9/29/2016	123.6	--
10/3/2016	98.8	--
10/6/2016	38.4	--
10/13/2016	18.7	54
West Fork Little Bear Creek - 1st and 2nd Order ID17060306CL061_02		
4/21/2016	4.1	--
4/25/2016	2	--
5/2/2016	5.2	--
5/9/2016	17.1	--
5/12/2016	17.1	7
7/21/2016	24.3	--
7/25/2016	8.4	--
7/28/2016	3.1	--
8/1/2016	dry	--

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
8/4/2016	dry	NA
9/26/2016	3	--
9/29/2016	1	--
10/3/2016	29.2	--
10/6/2016	62.4	--
10/13/2016	96	14
West Fork Little Bear Creek - 3rd Order ID17060306CL061_03		
4/21/2016	70.3	--
4/25/2016	32.8	--
5/2/2016	20.3	--
5/9/2016	22.8	--
5/12/2016	24.65	30
7/21/2016	365.4	--
7/25/2016	1119.9	--
7/28/2016	67	--
8/1/2016	27.5	--
8/4/2016	8.4	91
9/26/2016	2419.6	--
9/29/2016	42.8	--
10/3/2016	1203.3	--
10/6/2016	17.1	--
10/13/2016	172.3	206
Middle Potlatch Creek - Headwaters ID17060306CL062_02		
4/21/2016	9.8	--
4/25/2016	17.1	--
5/2/2016	14.6	--
5/9/2016	40.2	--
5/12/2016	24.3	19
7/21/2016	1	--
7/25/2016	1	--
7/28/2016	15.6	--
8/1/2016	47.3	--
8/4/2016	52.9	8
9/26/2016	3.1	--
9/29/2016	4.1	--
10/3/2016	29.5	--
10/6/2016	8.5	--
10/13/2016	9.8	8
Middle Potlatch Creek - 3rd Order ID17060306CL062_03		

Sample Date	*E. coli* (cfu/100 mL)	Geometric Mean
4/21/2016	5.2	--
4/25/2016	16.1	--
5/2/2016	31.7	--
5/9/2016	20.3	--
5/12/2016	18.7	16
7/21/2016	47.9	--
7/25/2016	126.6	--
7/28/2016	101.4	--
8/1/2016	104.6	--
8/4/2016	57.3	82
9/26/2016	21.8	--
9/29/2016	52.1	--
10/3/2016	31.3	--
10/6/2016	14.6	--
10/13/2016	17.5	25

Appendix B. Pine Creek AUs Phosphorus Data

Pine Creek ID17060306CL055_02

Sample Date	Flow (cfs)	TP (mg/L)
5/20/2016	0.48	0.0668
5/24/2016	0.9	0.069
6/7/2016	0.009	0.07
6/22/2016	Dry	NA
7/11/2016	Dry	NA

Pine Creek ID17060306CL055_03

Sample Date	Flow (cfs)	TP (mg/L)
5/20/2016	1.42	0.0791
5/24/2016	2.80	0.0742
6/7/2016	0.69	0.0866
6/22/2016	0.43	0.087
7/11/2016	0.46	0.0869

Appendix C. West Fork Little Bear Creek Nutrient Data

West Fork Little Bear Creek ID17060306CL061_02

Sample Date	Flow (cfs)	NO3/N+NO2/N (mg/L)	TKN (mg/L)
5/20/2016	1.02	ND	ND
5/24/2016	1.96	ND	ND
6/8/2016	0.59	ND	0.515
6/23/2016	0.2	ND	ND
7/11/2016	0.2	ND	ND

Note: ND = non-detect

West Fork Little Bear Creek ID17060306CL061_03

Sample Date	Flow (cfs)	NO3/N+NO2/N (mg/L)	TKN (mg/L)
5/20/2016	2.71	0.223	1.24
5/24/2016	4.69	0.126	1.05
6/8/2016	0.94	0.779	ND
6/23/2016	0.52	1.83	2.2
7/11/2016	0.50	1.96	2.92